The Impact of Digital Technologies on Contemporary Education

Jozef Vlčej[1], *Dušan Masár*[2]

DOI: https://doi.org/10.53349/re-source.2025.is1.a1414

Abstract

The position of the student in today's educational process is significantly influenced by the influence of digital technologies, which can have both positive and negative effects. For students to be able to educate themselves effectively and successfully in today's digital society, there is a need to have knowledge of digital literacy, i.e. the ability to work with digital technologies so that they are not dependent on them, but on the contrary make their lives easier or enable them to have a good standard of living thanks to them. The functioning of the student within the teaching process is also significantly influenced by social networks, which often impact their life values and attitudes towards education.

Keywords: Digital Learning Material, Social Networks, Digital Literacy, Education

1 Introduction

In a deeper analysis of the learner's position in the current dynamic era characterised by the digital revolution, which is linked to a multitude of technical innovations and changes, the learner is confronted with several specific factors that affect their performance and behaviour during the learning process. The fundamental objective of any educational process is to enrich the learner with theoretical and practical knowledge that they can use in their working career and future adult or family life. Another aim of the educational process is also to shape the personality of the learner and to lead them to positive values in life, so that they will be ready to successfully enter real life after graduation.

[1] Public Educational Institute Strážnice, Czechia, e-mail: j.vlcej@gmail.com
[2] Faculty of Public Policy and Public Administration, Danubius College Sládkovičovo, Slovakia, e-mail: dusan.masar@gmail.com

2 Current State of the Education System

In this subchapter we will focus on the analysis of the current state of the education system. The aim is not only to describe the negative aspects of the current education system, but also to propose potential solutions. Specifically, for instance, a deeper analysis of the current system of secondary and higher education in the Czech Republic may reveal that it may appear unfashionable and inefficient from the perspective of the student. Consequently, the student may develop a negative state of mind that discourages them from pursuing deeper study and work in the classroom. From students' point of view, and perhaps also employers', the school system is not adapting to current dynamic trends in the labour market. Particularly, for instance, today's secondary school students often study more than ten subjects in one school year and sometimes as many as fifteen (Fernstermacher, Soltis, 2008, p. 9). Thus, students certainly gain the necessary general social insight. Figuratively speaking, this system of knowledge is 'a bit of everything'. Compared to modern and developed countries, this may be an unfashionable or impractical style of education that may ultimately reduce the qualitative competitiveness of a country's economy. In some modern education systems, fewer subjects with more time allocation are proposed with the aim of greater practical focus and specialisation for practical application.

In our system, therefore, there are many courses that allow students to develop a broad social outlook. Thus, students learn a lot of different theory, but realistically they may not be able to remember and organize it in a systematic way in the long run. They often do not know how to connect it logically or deduce it into other schools of thought. Thus, students often must memorise a lot of theoretical knowledge in an unsystematic way, most of which they do not actually use in practical life. They thus become generalists rather than necessary specialists for the labour market. It is important to ask, however, what is the fundamental difference between those actual concepts that directly touch on learner applicability and the labour market? We will explain in the next subsection.

A more modern option could be a comprehensive change in the education system. Where the first year would be general possibly even with the current fifteen subjects. However, the student would then choose a specific specialisation to pursue in greater depth during the remaining years of study. This would create a system of education with fewer subjects but the same number of hours. The subjects would be profile-oriented and would systematically prepare the knowledge corresponding to the profile sought after and demanded by employers on the labour market. The main objective would thus be to build the most practical education and knowledge that the student can use in real life. In the current education system, students do build a broad general knowledge base. However, they may not be able to connect them systematically and may gradually forget them under the influence of the effect of extreme information overload (Domborovská, Šidlichovská, 2021, p. 50), but most importantly they may not be able to use them realistically when looking for a job.

Investing in education and school systems is one of the country's major strategic investments. The level of investment in education is therefore also a frequent measure of a country's success. Therefore, in the case of a negative scenario of long-term underfunding of the education system, this may be reflected in its declining quality. This may result in several students leaving for better quality universities abroad. This is the so-called brain drain. This may be reflected in the absence of important professions such as quality doctors, lawyers, IT specialists, teachers and many others. The absence of certain professional groups can lead to overall uncompetitiveness, particularly in the fields of science and the general quality of life within society. This issue is directly reflected in several areas of the school system. One problem is the level of teachers' financial remuneration, which has been mediocre for a long time and is reflected in the composition of the teaching staff. Many teachers are female, and the male component is significantly absent. Male teachers are often unable to make the teaching profession provide the required standard of living for their family. Therefore, the teaching profession is often unattractive for them. Several countries in Europe are systematically trying to motivate young people to become teachers through several benefits such as free accommodation, training opportunities and financial benefits

2.1 Education in the Digital Age

In contemporary society, there is an increasing demand for specialisation and expertise. Consequently, systematic education plays a crucial role. Lifelong learning is becoming an ever more prominent topic of discussion. To maintain one’s job and social status it is necessary for the individual to be educated throughout their life. In the case of long-term non-education, the individual is at risk of becoming unnecessary and uncompetitive in the labour market. Nevertheless, today, under the influence of the use of digital technologies, some believe that education is unnecessary and everything important can be found on the Internet. This is a partially true and logical attitude based on trends in society when most processes are being downplayed. However, critical thinking is disappearing, and physical and digital convenience can arise. Thus, quality education and information outlook are still indispensable components of career success in a digital society (Domborovská, Šidlichovská, 2021, p.11). Systematically building a high level of knowledge is a long-term process, with results in the form of specific expertise emerging over several years. Therefore, persistence and patience are essential. However, in the context of contemporary society, which places a premium on achieving results and success as quickly as possible, this process may not be feasible for many students.

3 The Importance of Digital Literacy in Education

Digital literacy is the ability to use the internet effectively. Specifically, to avoid being the target of, for example, a scam text or email scam. On the other hand, good digital literacy skills can allow us to work comfortably from home. A high level of digital and information literacy

acts as a preventive tool that allows us to be able to analyse qualitatively uncontrolled information coming from the Internet objectively and with insight. A positive factor of the digital revolution is the fact of increased digitisation of available information, which has a positive impact on the modernisation processes of education in society. The portfolio of available information accessible through modern technologies has significantly expanded. However, in real terms, there is currently no increase in the educational level of society. On the positive side, however, is the increased job mobility and the number of job opportunities and possibilities arising from working with digital tools. For example, home office work or the emergence of many new types of work such as in online marketing and many others.

There are both positives and negatives when analysing the impact of digital technologies on an individual's everyday life. In terms of positives, the previous sentence mentioned digital work and information mobility. However, on the negative side, more and more individuals are gradually becoming dependent on digital tools. Specifically, this includes, for instance, dependence on social networks and the Internet in general. The consequences can be impaired communication, emotional numbness and loss of empathy. The given assumptions are primarily based on a scientific study by the German psychiatrist Manfred Spitzer, which is widely available in book form with the title Digital Dementia (Spitzer, 2018, p. 48). In the given scientific study, which the author conducted in New Zealand on a representative sample of 1,000 individuals, he tested the effects of multiple hours of internet use on the level of education and the development of personality psyche. Spitzer came to some interesting findings. It is important to say, however, that the author does not perceive the Internet a priori negatively. It is certainly a revolutionary tool that has made every day human life significantly more dynamic and easier. However, the German author takes the liberty of pointing out the negative aspects resulting from its excessive use.

For example, when excessive, continuous use of the internet for several hours can lead to symptoms of digital addiction. In his study, Spitzer suggested a maximum digital time limit when the effects on normal behaviour and communication become real. He based his conclusions on the fact that if we spend more hours a day on digital tools than we sleep and do for months or years our brains do not naturally regenerate. There are potential consequences, such as the decline of multiple key abilities. This can include a decline in vocabulary, a tendency towards depression, emotional numbness and an overall loss of life motivation (Spitzer, 2018, p. 48). In extreme cases, this can lead to gradual brain degeneration resulting in digital dementia. It is important to add a technical note at this point. If an individual uses the internet to work effectively or as part of their profession for more than five hours a day, they are not at risk of potential digital dementia. The risk is unproductive time spent on the internet, whether in the form of social networking or computer games.

3.1 Teaching and digital learning material

In terms of the aspects of the functioning of contemporary society that are affected by the digital revolution, it is important to address the factors of the impact of digitalisation on the teaching process and the learning material. Therefore, to begin with, in the context of the quality of the teaching process, we consider it important to briefly focus on the issue of teaching substance. So, what should quality learning material look like? The main objective of a quality teaching substance should increase the attractiveness of the material presented that should be achieved by following and then practically using modern teaching trends. This could be, for instance, the increased use of more clearly structured texts. Looking more closely at the specific elements of qualitative improvement of teaching, we can also use the means of complex visualisation alongside the traditional tools of presenting teaching material. Specifically, this may involve the direct use of documentary demonstrations, various practical examples or animations, which aim to offer students an alternative practical perspective alongside the theoretical one, allowing them to perceive the teaching material from a different perspective.

The main goal of modern teaching material is to make it attractive enough for students. In this regard, the responsibility and role of teachers increase, as they need to present the material in an interesting and attractive way, so that the students are interested and at the same time the professional aspect of the material is maintained. This is a very difficult task nowadays, which also shows the teachers' mastery and creativity. Teachers and professionals often use a selection of interactive teaching methods as part of modern teaching strategies. Specifically, various modern multimedia digital devices such as large LCD devices that have a few modern touch functions are used, for instance, to teach mathematics and many other subjects (Holecek, 2015, p. 31). When teaching and using the before mentioned digital devices, a new type of learning material is used, which can be referred to as digital. Under the influence of the fourth digital revolution and the continuous dynamic transformation of societies, there is a growing trend of incorporating modern digital technologies into teaching.

The form of teaching through digital devices has its positives and negatives, which are important to analyse and describe. Positive factors may include ecological and economic aspects. When most of the teaching materials are prepared in the form of digital presentations of pdf or ppt files and others. Thus, students do not need to use paper textbooks or workbooks in their learning. They can also study the lectures, and the material presented through their smartphones or other digital devices, anytime and anywhere. This teaching style thus lowers the toll on the environment. Digital learning thus has a positive environmental dimension. It also has an economic dimension. Studying becomes cheaper for students as they can save money on notebooks and stationery.

A given style of study also has its share of negative influences. On the one hand, digital learning material significantly spares the environment. It also saves the cost of studying. A student's costs are limited to owning a digital device such as a smartphone, tablet or laptop. Thus, it is

one of the modern progressive methods of education. However, the given method of education might not be strictly better. A negative factor may be that with more digital learning material, the human brain of the learners will not retain the amount of information as when learning from, for example, a book or a workbook (Hasan, 2024, p. 103). Therefore, some learners prefer to take notes in a notebook in writing, as an example. This point is because our brain is evolutionarily accustomed to record information from books and notebooks that are made of natural materials. It is not yet accustomed to remembering information from digital devices, which the brain perceives as unnatural. This may be a relatively temporary condition where it will become natural for future generations, simply put, the brain will gradually become accustomed to the environment. However, this may take several generations (Hansen, 2021, p. 120).

3.2 Getting information from books and the Internet in teaching

At this point, it is important to ask the question where can the average student get quality and validated information for his general knowledge? Therefore, to know how to work and obtain information properly has always been an important advantage for the successful study of a learner. However, for the purpose of our work, we decided to briefly focus on comparing the specifics of information retrieval from the internet and book sources. Both have their specifics and are very significant for the successful orientation of contemporary learners. In the first case, the possibility of obtaining information from book sources. In the case of information obtained from books, there is an assumption that the book will be factually true. Thus, books, especially specialist books, should guarantee an impartial and objective view. Therefore, we can potentially work with a given type of information obtained as verified (Spitzer, 2018, p. 67). The veracity of the information presented can be guaranteed by the professional label of the publishing house or by peer review by multiple experts or reviewers. In the latter case, the internet can serve as a potential source of information. The Internet is the widest information source that has directly marked the global information revolution. Thus, the Internet is a wide and, most importantly, fast well of information in all possible fields. Through this network, where billions of individuals get access to information in case of internet connectivity, a wealth of information is disseminated all over the world.

For a closer historical comparison, in the past, it took several weeks to transmit information from Europe to the US by a letter or telegram, for example. Today, with an internet message, such as an e-mail or a social network message, information reaches the other side of the world in a matter of seconds. Another positive aspect of the Internet is the possibility of working through the home office system, which has brought about a revolution in employment law. Nowadays, however, there is often a debate about the quality and veracity of information. In the case of the Internet as a source of information, the aspect of verifiability and truthfulness of the information offered must be addressed. Through the Internet we have access to a range of interesting information. The Internet is thus an imaginary infinite well of information. However, the information system is often not regulated in terms of verifiability and

truthfulness. Thus, through the Internet, we can often access information that is often fictitious and unrealistic. Verified scientific theories are often questioned and alternative facts are presented as true. This increases the importance of information literacy.

However, there may be a problem if a large segment of the population begins to perceive false information as true. This creates room for manipulating public opinion by using so-called hoaxes. Consequently, a situation may arise where many individuals fall into a state of information confusion. In this state, individuals are often uncertain about what is true and what is not. One consequence of this can be, for instance, increased aggression and hostility on social media. How can this situation be addressed to enable citizens to achieve the highest possible level of information verifiability? One of the proposed recipes for maintaining as much information objectivity as possible could be an imaginary information rule of the Internet. What would this look like in practice? For example, if we come across a particular piece of information that interests us and we want to work with it as if it was true (Domborovská, Šidlichovská, 2021, p. 30). Then we should verify it using at least three independent verified sources. If we fail to do so, we may start spreading information that we admittedly consider to be true, though realistically, it may turn out to be fabricated and untrue.

4 Education and Artificial Intelligence?

Artificial intelligence, abbreviated as (AI), is increasingly becoming part of the digital society. Discussions on this topic have provoked both positive and negative reactions. Briefly summarised in terms of positive factors, AI can help, for example, in healthcare and in various other fields to make human life function more smoothly. On the other hand, from a negative perspective, people are concerned about the security aspects, lest we put ourselves at risk of possible dependence and vulnerability from AI. Simply put, should it begin to control us. But the question is, what will be the impact on the processes of education?

Under the influence of the digital revolution, it is often discussed which professions will gradually disappear or be replaced. The fact is that some professions are gradually disappearing (bank clerk, accountant). This raises the question: what will be the future status of the teaching profession? Will teachers gradually be replaced by digital technology or artificial intelligence? Based on current developments, it can be assumed for the time being that the teaching profession will not be replaced, and its importance will remain undeniable. Thus, the teaching profession still exists in an active physical and not digital form. However, the future may bring some surprising dynamic changes, such as we have been experiencing over the last decade. Gradually, a version of the digital teacher will emerge that works comprehensively with artificial intelligence in teaching and its preparation.

One of the trends is that although the position of the teacher and their influence, for example, through the involvement of digital learning materials (pdf, ppt) is constantly evolving, it is still of primary importance. Since the teacher is the main qualitative provider of knowledge and

with his specific qualities such as pedagogical tact and personal charm will still play an indispensable role even if we can already supplement it in the form of teaching through digital technologies. Looking at current trends, where we see artificial intelligence gradually beginning to penetrate everyday life, the question arises: can artificial intelligence in any form teach and replace the role of the teacher? (Mařík, Černý, Trčka et al., 2024, p. 120).

From our point of view, the answer takes several forms. From a slightly exaggerated futurological point of view, artificial intelligence can replace teachers in the delivery of educational material, for instance in the form of a hologram. It cannot, however, replace the teacher's educational dimension of influence on the learner, which is a very important component of the overall teaching process and the teacher's influence. When summarised comprehensively, it can act as a quality supplementary form in the future. In recent years, specifically since 2020, when the global world has been thrown into the so-called corona isolation, a crisis has arisen where space has been created for the closest possible integration of digital technologies into teaching. Under the influence of emergency circumstances, a digital form of teaching has emerged. This was a short-term emergency and crisis solution that fulfilled the fundamental purpose of maintaining continuity of teaching. The teacher brought his teaching into a virtual digital form.

However, when analysing the positives and negatives of digital learning during the corona crisis, we could see several facts. For example, the fact that the digital long-distance type of teaching fulfils certain qualitative elements of teaching became apparent. However, it can only have a positive effect as supplementary teaching as we have seen a weaker approach of students who, although they had comfortable and convenient conditions for studying, often were not motivated to take an active approach to studying with specific aspects of digital education. That's why the face-to-face active physical type of teacher's teaching seems to be irreplaceable.

Mainly in terms of the active involvement of the student and the overall interaction of the teaching. It must be added that digital education also has several positives. For example, a handpicked lecture by an important expert from another continent can be delivered remotely. Some universities are gradually switching to imaginary hybrid teaching. When part of the lectures take place in the form of online teaching, part face-to-face. If necessary, the student could choose according to his wishes. However, the conditions are created for the availability of education at greater distances, thus saving the travel costs of teachers and students. At the same time, student service and comfort are increased. The quality and professional content of education must remain a priority, and a digital learning system can make a positive and effective contribution to the expansion of society's level of education.

5 Suggestions for Improving the Current System of Education in a Digital Society

For society to become modern, stable and functional, it is important to be able to face and adapt to digital trends in society. Therefore, we propose the following solution to improve the current situation. The first proposal could be a certain form of Internet regulation. This is a very demanding and specific option. The Internet is a symbol of freedom of opinion and overall communication additionally as previously mentioned, the Internet is also a never-ending well of available interesting information. However, the given information is not regulated and fact checked. We have avoided this solution for several years. However, the current state of society, which is affected by the increased level of violence and aggression in virtual space, creates an environment for the necessity of a debate on certain forms of regulation. After all, the Internet today has the power to influence significant events, including elections—for instance, Donald Trump's victory in the 2016 US presidential election. Therefore, some form of systematic regulation should be considered to safeguard the fundamental principles and achievements of the Internet, namely the dissemination of objective information. However, this must be balanced with preserving its educational value while preventing the spread of falsehoods and the promotion of aggression.

Another solution could be a potential change in the media's information strategy, which would not focus primarily on the highest possible sales and profit, but on expert information on current social problems. Eliminating the aspect of media tabloidization towards deeper professional analysis of social problems. The last important proposed solution is to change the education system of citizens with the aim of maximizing the level of digital and information literacy. The goal is for most of the population to be able to filter the information they receive so that they do not become victims of hoaxes and various distortions that can manipulate public opinion in society. Citizens in today's modern societies receive information through state-of-the-art digital technologies. This should be a positive aspect in terms of options and the amount of information received.

However, we often observe a decline in society’s overall knowledge level. There is a lack of fundamental general awareness necessary for analysing common social and political issues, creating a breeding ground for speculators and supporters of conspiracy theories. Another concerning trend is the impact of modern digital communication technologies. When used as a supplementary tool in education, they can have a positive effect. However, if adolescents are exposed to digital media for more than seven hours a day from an early age, it can have significantly negative effects on their cognitive development, leading to serious developmental and learning disorders.

6 Conclusion

Thus, digital communication technologies certainly have an indisputable positive influence on the development of society. However, they also have several negative effects. We perceive the increased frequency of several types of mental disorders among teenage generations as alarming and therefore feel the importance of dealing with this specific issue, which can have a complex effect on the quality level of future generations and their ability to filter and analyse information. This can create a worldwide layer of misinformed individuals who will be easy prey for populist politicians. From the point of view of the analysis of the influence of the Internet, we can state that it is a positive tool for the development of global communication between people. The Internet is a fountain of maximum freedom of opinion. It is not regulated. There is a lot of interesting information on it. However, because it is not regulated, it also contains a few falsehoods and conspiracies that many people take as true, and it distorts their view and judgement.

The problem is the fact that an ordinary person cannot objectively verify and evaluate information on the Internet. The result is a very serious fact that people stop trusting everyday reality. They see something unfair and fraudulent behind everything. This can be dangerous for the spread of mob psychosis and aggression among people. Most children use the computer not to search for information, but to play games and kill free time, which can later negatively affect their emotional side and ability to respond empathetically to others. Young people can thus become emotionally apathetic or unambitious. In the short term, this may not appear problematic, but over time, a lack of social contact can lead to depression and anxiety. Human beings are inherently social, even if they temporarily convince themselves of self-sufficiency. Eventually, they seek connection with others. Therefore, the digital education of parents plays a crucial role. It is essential that they teach their children how to use the Internet and digital technologies responsibly — ensuring they do not become dependent on them but rather use them to enhance their quality of life.

Due to the transfer of communication to the Internet and social networks, young people may lack the personal confrontation and exchange of opinions that help stimulate the brain. Under the influence of communication moving to social networks, the style of communication among people is changing whether interacting with friends, partners or at work. The result can be emotional lability or a feeling of abandonment or even depression. It can be linked to not being able to handle critical situations that life brings, which creates the phenomenon of social deficit and digital convenience.

References

Bariso, J. (2022). *EQ in everyday life*. Ultimo press, ISBN 97880974312111

Fenstermacher, G., & Soltis, J. (2008). Teaching styles of teachers. Portál. ISBN 9788073674717

Goleman, D. (2020). *Emotional intelligence*. Grada publishing, Praha. ISBN 9788073593346

Hansen, A. (2021). *Instamozek*. Portál, Praha. ISBN 978-80-973459-1-4

Hasan, M. (2024). *Win every debate*. Ultimo press. ISBN 9788082890276

Holeček, M. (2015). *Psychology in teaching practice*. Grada. ISBN 9788024737041

Holubeková, H., Post-pandemic pedagogy, Lifeology, 2021, ISBN 9788097408107

JEDLIČKA, R., (2018). *Educational psychology for teachers*-. Grada. ISBN 9788027105861

Kersting, T. (2023). *Unplug*. Grada. ISBN 9788027136209

Mareš, P. (2022). *Cyberculture, hackers, and the digital revolution*. Grada. ISBN 9788027133581

Mařík, V., Trčka, M., & Černý D. (2024). *Why not be afraid of artificial intelligence*. Jota. ISBN 9788076894594

PRÚCHA, J. (2017). *Modern pedagogy*. Portál. ISBN 9788026212287

SMETÁČKOVÁ, I., ŠTECH, S. et al. (2020). *Teacher burnout*. Portál. ISBN 9788026216681

SPITZER, M. (2018). *Digital dementia*. Citadella. ISBN 9788081820885.